February 2, 2007

**A User's Guide to the World Heritage Criteria for Inscription**

The World Heritage Criteria, numbering ten in total for both cultural and natural sites, are not always easily interpreted. The wording of the criteria may appear obscure and/or ambiguous, especially for those unaccustomed to using them. This brief document attempts to shed light on the application of the criteria by the World Heritage Committee, in the hopes of giving applicants for the U.S. Tentative List of Future World Heritage Nominations a better understanding of how they should use the criteria in their proposals. The World Heritage Committee itself has recognized that a general public understanding of this topic is lacking. At its 2006 meeting in Vilnius, the Committee directed the World Heritage Centre, in cooperation with its Advisory Bodies, to undertake a historical review of past material and decisions illustrating precedents on how to interpret and apply discussions of outstanding universal value. Pending the completion of this study, we offer the following observations.

The World Heritage Convention's definitions of cultural and natural heritage and the currently adopted World Heritage criteria appear in full in the Operational Guidelines at Paragraphs 45-53 and 77-78, respectively, which can be found on the World Heritage Centre's web site at http://whc.unesco.org/pg.cfm?cid=57. The site also lists the properties on the World Heritage List and identifies the criteria under which each was inscribed. Committee documents for the various sessions often provide additional information, notably reviews of the nominations by ICOMOS and IUCN (see below). The complete nominations are not, however, accessible to the public. (All 20 U.S. nominations are posted on the OIA website, but the criteria have been changed and renumbered so that it is necessary to consult the text to identify the current criteria. In the past, there were two sets of criteria, one each for cultural and natural properties, but now a single set of 10 criteria is used.)

*What is the purpose of the World Heritage Criteria?*

The World Heritage Convention is intended to identify and help conserve natural and cultural sites of global significance. The World Heritage List is not intended to be simply an international compilation of national lists of significant sites, but rather a single global list of only those sites that possess "outstanding universal value." The World Heritage Committee's Operational Guidelines state, "The *Convention* is not intended to ensure the protection of all properties of great interest, importance or value, but only for a select list of the most outstanding of these from an international viewpoint. It is not to be assumed that a property of national and/or regional importance will automatically be inscribed on the World Heritage List."

In practice, the international criteria for both nature and culture are subject to differences of interpretation and the application of principles of selection in strikingly different ways, but still they are, in their basic intent, highly selective, almost exclusionary.

*Who applies the World Heritage Criteria?*

State parties to the World Heritage Convention first must identify properties that they believe meet the criteria in order to develop a Tentative List of properties that they intend to nominate over a ten-year period. The Secretary of the Interior decides what to include on the U.S. Tentative List, with the assistance of the National Park Service.

When a country makes a nomination from its Tentative List, the World Heritage Committee staff refers the nomination for review to one of two private organizations identified in the Convention: either the International Council on Monuments and Sites (ICOMOS) for cultural sites, or the World Conservation Union (IUCN) for natural sites (or both for mixed sites). These bodies review the nomination against the criteria, including a visit to the property by an expert who is not from the nominating country. ICOMOS and IUCN prepare detailed reports for the World Heritage Committee that assess how well a nominated site meets its proposed criteria, and which include analyses of how the site compares with other properties worldwide and examinations of the property's authenticity and integrity. The report concludes with a recommendation for or against listing for each criterion, and may support some criteria but not others.

The World Heritage Committee considers the recommendations and then applies the criteria in making their decision whether or not to list the nominated property. They sometimes accept the ICOMOS and IUCN recommendations as presented, and sometimes take other action. As an elected body, the membership changes periodically and decisions reflect the opinions of the current members. As a result, the record of how the criteria have been applied over time may appear ambiguous. No thorough guide to their past application by the World Heritage Committee has ever been prepared.

Therefore, in recommending what properties to include on the Tentative List, the National Park Service is mindful of how IUCN, ICOMOS and the World Heritage Committee have applied the criteria, particularly in recent years. Tracking both successful and unsuccessful nominations in the past, both by the U.S. and by other countries, gives us guidance as to which approaches are most likely to result in world heritage listings.

*Is it better to use more or fewer criteria?*

In recent years, there has been a tendency for nominations to increase the number of criteria proposed. However, the Committee has commented unfavorably on this approach. A larger number of criteria does not increase the chances of a nomination being inscribed by the committee; only one solidly met criterion is necessary for inscription. Moreover, presenting several criteria that are weakly supported tends to have the effect of weakening or "watering down" the overall nomination.

*How do the World Heritage Criteria differ from the National Register / National Historic Landmark criteria?*

For those accustomed to applying the National Register criteria to cultural properties, the World Heritage Criteria can seem bewildering. The two sets of criteria take different approaches to significance, and there are areas where they simply don't overlap. The National Register criteria are more comprehensive of types of significance and how various property types can illustrate them. For example, while it is perfectly appropriate to list a property that has strong associations with a person whose achievements were of national significance as a National Historic Landmark, that is not an approach supported by the World Heritage Criteria, either as they are written or as they have been applied. Nor is there an equivalent to National Register Criterion D, regarding the potential information value of archaeological sites. Some of these differences reflect the political sensitivities involved in international designations relating to worldwide political / cultural developments (especially relatively recent ones).

*What is the difference between "authenticity" and "integrity"?*

"Authenticity" is a term that is little used in preservation and conservation in the United States, although our use and understanding of the term "integrity" generally embraces both of the two concepts as they are used internationally. Briefly, "authenticity" addresses the genuineness of the resource: whether it has original materials, location, etc. It also includes less tangible qualities of tradition, function and spirit, in order to accommodate the full range of world cultures and what they consider significant. "Integrity," on the other hand, as used by the World Heritage Committee, has a more limited focus on whether the resource is whole and intact, in good condition, and whether it contains all the elements needed to express its significance. It is necessary to address both these concepts separately in an application for the Tentative List, referring to specific characteristics of the property. However, a property that has high "integrity" in the American sense should have no difficulty addressing both.

## THE WORLD HERITAGE CULTURAL CRITERIA

*(annotated, with examples)*

**Cultural Criterion (i): Represent a masterpiece of human creative genius**

This criterion is most often used in conjunction with other criteria, particularly (iii) and (iv). This seems to be because the number of universally acknowledged masterpieces in fields other than architecture and engineering has proven, in practice, to be quite small.

Generally speaking, however, this criterion has been accepted by the World Heritage Committee when proposed for the outstanding works of a notable architect or engineer. For example, it was successfully applied to the work of internationally recognized architects in the following examples from sites in Mexico and Spain, respectively. It was also used to justify the inscription of the Statue of Liberty.

To date, criterion (i) does not appear to have been used alone clearly and unequivocally to justify the inscription of a home or other property associated with an individual of genius.

**Examples**:

**Luis Barragán House and Studio (Mexico)**, built in 1948, represents an outstanding example of the architect's creative work in the post-Second World War period. It is a masterpiece of the new developments in the Modern Movement, integrating modern and traditional artistic and vernacular currents and elements into a new synthesis, which has been greatly influential in the contemporary design of gardens, plazas, and landscapes. *Also listed under criterion (ii).*

**Parque Guell, Palacio Guell, and Casa Mila in Barcelona (Spain)** are works by Antonio Gaudí that represents an exceptional and outstanding creative contribution to the development of architecture and building. They may be seen as truly universal in view of the diverse cultural influences that inspired them. They represent an eclectic as well as a very personal style which was given free reign not only in the field of architecture but also in gardens, sculpture and all forms of decorative art. *Also listed under criteria (ii) and (iv).*

**The Statue of Liberty (USA),** a 19th century successor to the colossal statues of antiquity, is a masterpiece of the human spirit that has transcended its original symbolism commemorating the alliance between the United States and France. The collaboration between the sculptor Bartholdi, the engineer Eiffel, and the architect Richard Morris Hunt resulted in the production of a technological wonder that brought together art, engineering, and architecture in a new and powerful way. *Also listed under criterion (vi).*

***Other Examples*:**

Taj Mahal, India
Mausoleum of the Emperor Qin, China
Altamira, Spain
Chateau of Chambord, France

**<u>Cultural Criterion (ii):</u> Exhibit an important interchange of human values, over a span of time or within a cultural area of the world, on developments in architecture or technology, monumental arts, town planning or landscape design**

Concerned primarily with the degree to which an architectural design or work of engineering has influenced or been the model for others either throughout a large region or globally or for a long period; the criterion has been successfully used by colonial sites where design ideas from the parent culture have been locally adapted, as in the example from Cordoba, Argentina. Additionally, in the case of the Struve Geodetic Arc, a multi-

national serial inscription, the criterion was accepted the on the basis of scientific interchange and cooperation.

In some cases, the criterion has been loosely interpreted to accept sites that have been highly influential on literature and the arts. In other instances, the criterion seems to have been somewhat inconsistently applied, with some sites that represent different aspects of intangible heritage, with legendary and spiritual associations, being turned down.

This criterion has been criticized as excessively favoring highly influential colonial or imperial cultures. It has also been hard to distinguish between the relative merit of sites that exert influence on the one hand, and those, on the other hand, that are influenced, and which may in turn influence others.

There has been difficulty in discerning how to apply this criterion vis-à-vis criterion (iv), together with which it has often been proposed.

**Examples**:

**Jesuit Block and Estancias of Córdoba (Argentina)** are exceptional examples of the fusion of European and indigenous values and cultures during a seminal period in South America. Heart of the former Jesuit Province of Paraguay, the Block contains the core buildings of the Jesuit system—the university, the church and residence of the Society of Jesus, and the college. Along with the estancias, or farming estates, they contain religious and secular buildings, which illustrate the unique religious, social, and economic experiment carried out here for a period of over 150 years in the 17th and 18th centuries. *Also listed under criterion (iv*).

**Monastery of Geghard and the Upper Azat Valley (Armenia)**, with its remarkable number of rock-cut churches and tombs, is an exceptionally well preserved and complete example of medieval Armenian monastic architecture and decorative art, with many innovative features which had a profound influence on subsequent developments in the region. The complex is set in a landscape of greaty natural beauty surrounded by towering cliffs at the entrance to the Azat Valley.

**Royal Exhibition Building and Carlton Gardens (Australia)**, were designed for the great international exhibitions of 1880 and 1888 in Melbourne. Together they reflect the global influence of the international exhibition movement of the 19th and early 20th centuries. The movement showcased technological innovation and change, which helped promote a rapid increase in industrialization and international trade through the exchange of knowledge and ideas.

**Struve Geodetic Arc (10 European countries),** which represents the first accurate measuring of a long segment of a meridian, helping in the establishment of the exact size and shape of the world, thus exhibiting an important step in the development of earth sciences. It is also an extraordinary example for interchange of human values in the form of scientific collaboration among scientists from different countries. It is at the same time

an example for collaboration between monarchs of different powers, for a scientific cause. *Also listed under criteria (iii) and (vi).*

***Other Examples***:

Ironbridge Gorge, United Kingdom
Medina of Tunis, Tunisia
Kyoto, Japan
Mount Taishan, China
Church and Convent of Santa Maria della Grazie (with the "Last Supper" fresco), Italy

**<u>Cultural Criterion (iii):</u> Bear a unique or at least exceptional testimony to a cultural tradition or to a civilization which is living or which has disappeared.**

This criterion has often been used alone, but also in conjunction with criterion (i). Considerable weight has been given to properties that are regarded as significant to those entrusted with the preservation of cultural traditions and to the opinions of nations that include living civilizations, as well as their significance to successor states to those that have disappeared.

This criterion has been characterized as including representative archeological and historical properties.

There has been difficulty in discerning how to apply this criterion vis-à-vis criterion (v) together with which it has often been proposed.

**Examples**:

**Tikal (Guatemala)** was one of the major sites of Mayan civilization, inhabited from the 6th to 10th centuries AD. The ceremonial center contains superb temples and palaces and public squares accessed by means of ramps. *Also listed for cultural criteria (i) and (iv) and natural criteria (ix) and (x).*

**SGaang Gwaay (Anthony Island) (Canada)** is a site commemorating the living culture of the Haida people of the Pacific Coast. It includes remains of houses, together with carved mortuary and memorial poles. The site illustrates the Haidas' relationship to the land and sea and offers a visual key to their oral traditions.

**<u>Cultural Criterion (iv):</u> Be an outstanding example of a type of building, architectural or technical ensemble or landscape which illustrates (a) significant stage(s) in human history.**

This criterion has often been used alone to nominate massive sites that are the product of great collective effort or over a long period of time, such as through the building of cities or major fortifications. It has also been invoked if the identities of the architects and builders are uncertain or unknown or if the works in question are not regarded as masterpieces of architecture, but possess other distinguishing characteristics, such as massive size.

There has been difficulty in discerning how to apply this criterion vis-à-vis criterion (ii), together with which it has often been proposed.

**Examples**:

**San Souci, Citadel, and Ramiers (Haiti)** are monuments that date from the beginning of the 19th century, when Haiti proclaimed its independence. They serve as universal symbols of liberty, being the first monuments to be constructed by black slaves who had won their freedom. *Also listed for criterion (vi).*

**Timgad (Algeria)** is an excellent example of Roman colonial town planning. It was established as military colony by the Emperor Trajan in 100 AD. It has a square enclosure and orthogonal design based on the cardo and decumanus, the two perpendicular routes running through the city. *Also listed under criteria (ii) and (iii).*

**Volklingen Ironworks (Germany)** are the only intact example, in the whole of western Europe and North America, of an integrated ironworks that was built and equipped in the 19th and 20th centuries and has remained intact. *Also listed under criterion (ii).*

**<u>Cultural Criterion (v):</u> Be an outstanding example of a traditional human settlement land-use or sea-use which is representative of a culture (or cultures) or human interaction with the environment, especially when it has become vulnerable under the impact of irreversible change.**

There has been significant debate over the character of properties that are nominated under this criterion, which includes what is termed vernacular architecture in the United States and what is regarded as traditional architecture in Africa and Asia, which often utilizes fragile materials and traditional methods, and raises questions about authenticity and integrity.

There has been difficulty in discerning how to apply this criterion vis-à-vis criterion (iii), together with which it has often been proposed.

**Examples**:

**Lunenburg (Canada)** is perhaps the best surviving example of a planned British colonial

settlement in North Anerica. Established in 1753, it has retained its original layout and overall appearance, based on a rectangular grid pattern drawn up in the home country. The wooden architecture of the houses has been preserved, helping to safeguard the city's identity. *Also listed under criterion (iv).*

**Mount Taishan (China)** was the object of an imperial cult for nearly 2000 years and the artistic masterpieces found there are regarded as in perfect harmony with the natural landscape. The Mount has been a source of inspiration for Chinese artists and scholars and symbolizes ancient Chinese civilizations and beliefs. *Mount Taishan was listed under all six cultural criteria and natural criterion (vii).*

**Sukur Cultural Landscape (Nigeria),** with the Palace of the Hidi (Chief) on a hill dominating the villages below, the terraced fields and their sacred symbols, and the extensive remains of a former flourishing iron industry, is a remarkably intact physical expression of a society and its spiritual and material culture. *Also inscribed under criteria (iii) and (vi).*

**<u>Cultural Criterion (vi):</u> Be directly or tangibly associated with events or living traditions, with ideas, or with beliefs, with artistic and literary works of outstanding universal significance (preferably used in conjunction with other criteria).**

There has been much debate over attempts to apply this criterion alone, and for almost a decade, until it was recently modified, it could only be used in conjunction with other criteria. Because of differing cultural interpretations of politics, literature, and art; issues of national identity; historical conflicts and disputes, and history's tragic events, this criterion has proven very difficult to apply. For example, politically charged sites from large countries have generally been accepted (Hiroshima and Independence Hall) while some important to smaller nations have not, provoking concern on the part of the latter as to what their participation in the Convention means if they are not able to attain representation in it.

**Examples**:

**Quebec (Canada)** is the only North American city to have preserved its ramparts, together with numerous bastions, gates, and defensive works. The Upper Town, built on the cliff, has remained the religious and administrative center, with churches, convents, and other monuments like the Dauphine Redoubt, the Citadel, and Chateau Frontenac. Together with the Lower Town and its old districts, it forms an urban ensemble which is one of the best surviving examples of a fortified colonial city. *Also listed under criterion (iv).*

**Auschwitz (Poland)** was the largest concentration and extermination camp built by the Nazis. At this site, which includes nearby Birkenau, 1,500,000 people, including a disproportionate number of Jews, were systematically starved, tortured, and murdered during the last few years of the Third Reich. The fortified walls, barbed wire, barracks,

gallows, gas chambers, and cremation ovens show the conditions under which the genocide took place. Auschwitz has also been described as the world's largest cemetery.

**Goree Island (Senegal)** was the largest slave-trading center on the African coast from the 15th into the 19th centuries. Ruled in succession by the Portuguese, Dutch, English, and French, its architecture is characterized by the contrast between the grim slave quarters and the elegant houses of the slave traders.

## THE WORLD HERITAGE NATURAL CRITERIA

(**Note:** the text and boxes in the section below on the natural criteria for World Heritage are taken from IUCN's publication "*The World Heritage List: Guidance and future priorities for identifying natural heritage of potential outstanding universal value*." The complete paper is on-line here:
http://www.iucn.org/themes/wcpa/pubs/pdfs/heritage/OutstandingUniversalValue.pdf

**Criterion vii: to contain superlative natural phenomena or areas of exceptional natural beauty and aesthetic importance;**

Two distinct ideas are embodied in this criterion. The first, 'superlative natural phenomena,' can often be objectively measured and assessed (the highest mountain, the most extensive largest cave system etc.). The second, that of 'exceptional natural beauty and aesthetic importance,' is harder to quantify and tends to be assessed on the basis of a wide range of expert advice which compares the property under consideration to other comparable sites inscribed under this criterion.

Properties nominated for inscription will have comparable sites distributed on a worldwide, rather than regional basis, so standards applied under this criterion need to meet the highest global standards. This global standard can help to distinguish the application of the aesthetic element of this criterion from more local or regional factors, which may be more relevant to the consideration of cultural landscapes.

A total of **117 properties** have been inscribed in the World Heritage List under this criterion, 6 on the basis of this criterion alone and the rest in combination with other criteria.

**Examples**:

Widely known for its exceptional natural beauty and considered one of the world's most visually powerful landscapes, the **Grand Canyon** is celebrated for its plunging depths; temple-like buttes; and vast, multihued, labyrinthine topography. Scenic wonders within park boundaries include high plateaus, plains, deserts, forests, cinder cones, lava flows, streams, waterfalls, and one of America's great whitewater rivers. *Also inscribed for criteria (viii), (ix), and (x).*

The parks that comprise the **Tropical Rainforest Heritage of Sumatra (Indonesia)** are all located on the prominent main spine of the Bukit Barisan Mountains, known as the 'Andes of Sumatra'. Outstanding scenic landscapes abound at all scales. The mountains of each site present prominent mountainous backdrops to the settled and developed lowlands of Sumatra. The combination of the spectacularly beautiful Lake Gunung Tujuh (the highest lake in southeast Asia), the magnificence of the giant Mount Kerinci volcano, numerous small volcanic, coastal and glacial lakes in natural forested settings, fumaroles belching smoke from forested mountains and numerous waterfalls and cave systems in lush rainforest settings, emphasizes the outstanding beauty of the Tropical Rainforest Heritage of Sumatra. *Also inscribed for criteria (ix) and (x).*

***Other Examples*:**

Rocky Mountain Parks, Canada
Mosi-oa-Tunya/Victoria Falls, Zambia-Zimbabwe
Ha Long Bay, Viet Nam

**<u>Criterion viii</u>: to be outstanding examples representing major stages of earth's history, including the record of life, significant on-going geological processes in the development of landforms, or significant geomorphic or physiographic features;**

This criterion recognizes four different natural elements relevant to geological and geomorphological science: the earth's history, the record of life, ongoing geological process, and geomorphic or physiographic features. Each of these elements is briefly described in the box below.

**Box 3 Description of natural elements of earth science recognized in criterion (viii)**

*(a) Earth's history*
This subset of geological, as opposed to geomorphological, features is represented by phenomena that record important events in the past development of the planet such as:

- the record of crustal dynamics and tectonism, linking the genesis and development of mountains, volcanoes, plate movements, continental movement and rift valley development;
- records of meteorite impacts; and
- records of glaciations in the geological past.

Properties in this category are considered to be of *outstanding universal value* in exhibiting elements of earth history through rock sequences or associations rather than fossil assemblages.

*(b) Record of life*
This subset includes palaeontological (fossil) properties. An IUCN thematic study (Wells, 1996) considers the role of such properties in the World Heritage List and provides a framework for their assessment.

*(c) Significant on-going geological processes in the development of landforms*
This element is the first of two aspects related to geomorphology and ongoing geological processes, such as volcanic eruptions. It relates to active processes that are shaping or have shaped the Earth's surface. Properties recognised under this element include those that are of *outstanding universal value* as examples of:

- arid and semi-arid desert processes;
- glaciation;
- volcanism;
- mass movement (terrestrial and submarine);
- fluvial (river) and deltaic process processes; and
- coastal and marine processes.

*(d) Significant geomorphic or physiographic features.*
This second primarily geomorphological element represents the landscape products of active or past processes, which can be identified as significant physical landscape features. Criterion (viii) recognizes these features in relation to their scientific value: however, frequently they may also be of aesthetic value. Properties recognised within this part of the criterion may include those of *outstanding universal value* as:

- desert landforms;
- glaciers and ice caps;
- volcanoes and volcanic systems, including those that are extinct;
- mountains;
- fluvial landforms and river valleys;
- coasts and coastal features;
- reefs, atolls and oceanic islands;
- glacial and periglacial landforms, including relict landscapes; and
- caves and karst.

(Source: *Geological World Heritage*. Dingwall *et al.*, 2005)

A new global thematic study on *Geological World Heritage* with respect to criteria (viii) has been produced by IUCN (Dingwall *et al.*, 2005) to guide the assessment of *outstanding universal value*. The study shows that geological heritage comprises a major component of the current World Heritage network: a total of **71 properties** in 42 countries are judged **have geological features of *outstanding universal value***, although not all are inscribed under criterion (viii), as discussed in the previous section; and a further 53 properties are considered to demonstrate a significant degree of geological interest but not to the level of *outstanding universal value*.

The study identifies 13 themes to assist in understanding the operation of this criterion with respect to the four different earth science values embodied within it. The themes are listed and briefly described below. More work is required to understand the application of *outstanding universal value* within each of these themes.

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**Conceptual framework of 13 themes proposed for the assessment of *outstanding universal value* of geological heritage**

1. **Tectonic and structural features** Elements of global-scale crustal dynamics including continental drift and seafloor spreading. Major crustal landforms and structural features at plate boundaries. Geosyncline/anticline development and erosion; riftvalley systems.
2. **Volcanoes/volcanic systems** Major areas and types of volcanic origin and evolution. These may include examples of major features, such as the 'Pacific Ring of Fire', as a global-scale expression of volcanic activity and associated crustal movements.
3. **Mountain systems** Major mountain zones and chains of the world.
4. **Stratigraphic sites** Rock sequences that provide a record of key earth history events.
5**. Fossil sites** The record of life on Earth represented within the fossil record (see also Wells, 1996).
6. **Fluvial, lacustrine and deltaic systems** Land systems resulting from large-scale river erosion and drainage system development, lakes, wetlands and deltas.
7. **Caves and karst systems** Subterranean hydrological processes and landforms, together with their surface expressions.
8. **Coastal systems** The role of water at oceanic margins on large-scale erosional and depositional coasts and banks.
9. **Reefs, atolls and oceanic islands** Geo-biological and/or volcanic features in oceanic areas or with oceanic influences.
10. **Glaciers and ice caps** The significant role of ice in landform development in alpine and
polar regions, including periglacial and nivation (snow) influences.
11. **Ice Ages** Global patterns of continental icesheet expansion and recession, isostasy, sea-level changes, and associated biogeographic records.
12. **Arid and semi-arid desert systems** Land systems and features reflecting the dominant role of wind (eolian processes) and intermittent fluvial action as agents of landform development and landscape evolution.
13. **Meteorite impact** Physical evidence of meteorite impacts (astroblemes), and major changes that have resulted from them, such as extinctions.
(Source: *Geological World Heritage*. Dingwall *et al.,* 2005)

**Examples**:

**Mammoth Cave (USA)** exhibits 100 million years of cave-forming action and presents nearly every type of cave formation known. Geological processes involved in their formation continue. Today, this huge and complex network of cave passages provides a clear, complete and accessible record of the world's geomorphic and climatic changes. Outside the cave, the karst topography is superb, with fascinating landscapes and all of the classic features of a karst drainage system: vast recharge area, complex network of underground conduits, sink holes, cracks, fissures, and underground rivers and springs. *Also inscribed for criteria (vii) and (x).*

In its representation of vertebrate life, **Miguasha (Canada)** is the most outstanding fossil site in the world for illustrating the Devonian as the "Age of Fishes." The area is of paramount importance in having the greatest number and best preserved fossil specimens found anywhere in the world of the lobe-finned fishes that gave rise to the first four-legged, air-breathing terrestrial vertebrates - the tetrapodes.

***Other Examples:***

Dinosaur, Canada
Pirin, Bulgaria
Galapagos, Ecuador

**Criterion ix - Ecological and biological processes**
**Criterion x - Biological diversity**

These two criteria are usefully discussed together because they are closely linked and often used in combination with each other. A total of **46 natural properties** have been inscribed on basis of these criteria alone, either singly or in combination, and a further **23 properties** on the basis of criteria (vii), (ix) and (x).

Assessment of criterion (ix) depends on a scientific understanding of the world's ecosystems and their associated ecological and biological processes. A range of thematic studies have been generated to assess *outstanding universal value* with respect to ecosystems, such as tropical forest, boreal forest, tropical marine and coastal, wetlands, mountains, and centres of plant and animal biodiversity. (These studies can be found on IUCN-US's World Heritage website: http://www.iucn.org/places/usa/webdocs2006/programs/programsWH.htm). Others are proposed for arid lands, freshwater and the polar regions.

A recent global study of the coverage of biogeography, major habitats and centres of high biodiversity within the World Heritage network by UNEP-WCMC (2004) provides a valuable tool for assessing the *outstanding universal value* of properties nominated under criteria (ix) and (x). The study provides analyses of two biogeographic classification systems, two habitat classification systems and three biodiversity prioritization schemes, each of which is briefly described in the next box.

Box 5 **Classification and prioritization schemes used to assess *outstanding universal value* in relation to biological processes (Criterion ix) and biodiversity (Criterion x)**

*Biogeography*

- **Udvardy biogeographic system**

  This classification system comprises 8 biogeographic *realms*, subdivided into 193 biogeographic *provinces*, and 14 ecosystem types or *biomes*. It has proved to be an effective framework for assessing potential natural World Heritage but does not cover the marine environment.

- **WWF Global 200 Ecoregions**

  Global 200 refers to a subset of 238 Ecoregions considered to be of highest priority for conservation and derived from a total of 867 ecoregions. It comprises 142 terrestrial, 53 freshwater and 43 marine Ecoregions.

*Habitats*

- **IUCN Species Survival Commission Global Habitat Classification**

  This scheme divides the world's terrestrial and marine habitats into a hierarchical series of 13 first-level habitat categories, 78 second-level categories and 154 third-level categories. The first-level habitat category has proved the most useful for World Heritage purposes.

- **Global Land Cover Characterisation**

  This classification system, developed by Olson (1994a, 1994b), recognizes 94 ecosystem classes using 1 $km^2$ AVHRR (Advanced Very High Resolution Radiometer) data. Ecosystem classes are based on their land cover mosaic, floristic properties, climate and physiognomy.

*Biodiversity*

- **Conservation International Biodiversity Hotspots**

  Conservation International has identified 25 biodiversity hotspots around the world, based principally on their high plant endemism and significant human impact. A region must contain 1,500 endemic plant species (0.5% of the global total). Such hotspots also support an enormous number of endemic animal species. CI notes that 44% of all vascular plant species and 38% of all animal species occur in less than 2% of the globe's terrestrial area.

- **BirdLife International Endemic Bird Areas**

  BirdLife International has designated approximately 2% of the world's land surface as Endemic Bird Areas (EBAs), of which 218 have been identified on the basis of encompassing the breeding ranges of two or more bird species whose total breeding ranges are restricted to 50,000 $km^2$ or less. These cover the ranges of 93% of restricted range birds (2,451 species or approximately 25% of all known bird species).

- **WWF/IUCN Centres of Plant Diversity**

  Principally on the basis of high diversity of species or numbers of endemic species, or both, 250 centres of plant diversity have been identified globally. Other criteria include habitat diversity, under threat of large-scale devastation, and importance as gene pools for plants of value to humans.

**<u>Criterion (ix)</u>: to be outstanding examples representing significant on-going ecological and biological processes in the evolution and development of terrestrial, fresh water, coastal and marine ecosystems and communities of plants and animals;**

**Examples:**

In the jointly listed **Kluane/Wrangell St. Elias/Glacier Bay/Tatshenshini-Alsek World Heritage Site (Canada-USA),** the influence of glaciation at a landscape level has led to a broad range of stages in ecological succession related to the dynamic movements of glaciers. Subtly different glacial environments and landforms have been concentrated by the sharp temperature and precipitation variation between the coast and interior basins. There is a rich variety of terrestrial and coastal/marine environments with complex and intricate mosaics of life at various successional stages from 500 meters (1,500 feet) below sea level to 5000 meters (15,000 feet) above. *Also inscribed for criteria (vii), (viii) and (x).*

As the largest no-fishing zone in the Eastern Tropical Pacific, the **Malpelo Fauna and Flora Sanctuary (Colombia)** is a globally significant and largely pristine marine protected area with unaltered and non-threatened ecosystems, free of invasive species, that is essential to maintain and replenish the population of sharks, giant grouper and billfish in the Eastern Tropical Pacific, whilst providing unique opportunities for ecosystem conservation, research, and recreational diving. *Also inscribed for criteria (vii).*

**Guanacaste Conservation Area (Costa Rica)** demonstrates significant, major biological and ecological processes in both its terrestrial and marine-coastal environments, as exemplified by: a) evolution, succession and restoration of Pacific Tropical Dry Forest; b) altitudinal migration and other interactive biogeographic and ecological processes along its dry forest - montane humid forest - cloud forest - lowland Caribbean rain forest transect; and, c) the major upwelling and development of coral colonies and reefs in regions long considered to not have either (marine area near the coast of the Murcielago sector of Santa Rosa NP). *Also inscribed for criteria (x).*

***Other Examples*:**

Great Barrier Reef, Australia
Air and Tenere National Park, Niger

**<u>Criterion x</u>: to contain the most important and significant natural habitats for in-situ conservation of biological diversity, including those containing threatened species of outstanding universal value from the point of view of science or conservation.**

**Examples:**

**Mexico's El Vizcaino Whale Sanctuary** protects a large number and variety of animal and plant species of which a considerable number are endemic and threatened. The coastal lagoons of Ojo de Liebre and San Ignacio are an exceptional reproduction and wintering site for grey whales as well as other mammals like harbor seal, California sea-lion, northern elephant-seal and blue whale. The site also protects four species of endangered marine turtle.

**Donana National Park (Spain)** has high fauna1 diversity, notably an avifauna consisting of 360 species of breeding and migratory birds. It contains breeding populations of several globally-threatened animal (marbled teal, white-headed duck, Adalbert's eagle, Spanish lynx) and plant species. It is an important wintering site for wildfowl, receiving hundreds of thousands of migratory duck and geese every year. Donana includes one of the last large stretches of undeveloped pristine coastline in Spain, and its largest wetland. *Also inscribed for criteria (vii) and (ix).*

**The Great Smoky Mountains National Park** is of the one of the most ecologically rich and diverse temperate zone protected areas in the world. There are over 1300 native vascular plant species, including 105 native tree species, plus nearly 500 species of non-vascular plants - a level of floristic diversity that rivals or exceeds other temperate zone protected areas of similar size. The park is also home to the world's greatest diversity of salamander species (31) - an important indicator of overall ecosystem health - and is the center of diversity for lungless salamanders, with 24 species. *Also inscribed for criteria (vii), (viii) and (ix).*

***Other Examples*:**

Garamba, Congo
Manas, India

Table 2 **Frequency of the use of the different natural World Heritage criteria**

| Type of World Heritage property<br>Basis of inscription | Natural World Heritage criteria | | | |
|---|---|---|---|---|
| | Natural phenomena<br>vii | Geological processes[1]<br>viii | Biological processes<br>ix | Biodiversity conservation<br>x |
| **Natural properties** | | | | |
| Inscribed on basis of single criterion | 6 | 11 | 3 | 12 |
| Inscribed on basis of several criteria[2] | 90 | 50 | 95 | 95 |
| **Mixed natural/cultural properties** | | | | |
| Inscribed on basis of several criteria[2] | 21 | 5 | 11 | 10 |

[1] Geological properties are underrepresented, as no account is taken of changes to the definitions of criteria in 1994.

[2] Properties inscribed on the basis of this criterion in combination with one or more other criteria. (Note that, by definition, mixed natural/cultural properties also meet at least one of the cultural World Heritage criteria.)

**SOURCES:**

This discussion of the World Heritage criteria was based on references to the criteria in the following sources, which may be consulted for additional information.:

ICOMOS. **The World Heritage List: Filling the Gaps—an Action Plan for the Future. With Annexes**. Paris; 2005. This study, which discusses various frameworks for examining World Heritage Sites (typological, chronological-regional, and thematic) includes helpful discussions and lists, including topics that are unrepresented or under-represented on the World Heritage List, along with lists of regional and topical studies that may be useful in preparing international comparative evaluations of sites. ICOMOS has also been charged with presenting to the World Heritage Committee later in 2007 a study of the evolution and application of the World Heritage cultural criteria.

IUCN. **The World Heritage List: Guidance and future priorities for identifying natural heritage of potential outstanding universal value**. (Available on World Heritage Centre website as part of Document WHC-06/30.COM/INF.9 at www.unesco.org/whc, under 2006 Committee documents. See pages 21-36. http://www.iucn.org/themes/wcpa/pubs/pdfs/heritage/OutstandingUniversalValue.pdf)

Dingwall. **IUCN's Geological World Heritage – A Global Framework** http://www.iucn.org/places/usa/webdocs2006/documents/progWH/thematic/Geological%20World%20Heritage%20Global%20Framework2005.pdf IUCN, 2005

National Park Service**, A Guidebook to the U.S. World Heritage Program**. Pp.21-30. http://www.nps.gov/oia/topics/worldheritage/Guide%20to%20U.S.%20World%20Heritage.doc

Pressouyre, Leon. **The World Heritage Convention, twenty years later**. Paris: UNESCO Publishing, 1996. Pp. 11-31. *(Out of print.)*